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I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

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Signed

Dated 28 March 2000

Patents Act 1977
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1/77

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference BED 2

2. Patent application number *(The Patent Office will fill in this part)* 05 MAR 1999 9905005.6

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

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Patents ADP number *(if you know it)*

5628011003

7615743001

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BOONDALL, QUEENSLAND
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1456930 01

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention PORTABLE DEVICE FOR THE ASSESSMENT OF MATTRESSES

5. Name of your agent *(if you have one)*

Form 51/77 22/3/

Brookes & Martin
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HEMEL HEMPSTEAD
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Patents ADP number *(if you know it)*

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	2
Claim(s)	0
Abstract	0
Drawing(s)	2+2 (8)

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature D BAIN P DAVIES P DAVIES M HELLBUSON-PELL Date 3/3/99

12. Name and daytime telephone number of person to contact in the United Kingdom — DUNCAN BAIN 0181 954 2300 x 756

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.*

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P rtabl device for the assessment of mattresses

Bain, DS; Davies, PJ; Ferguson-Pell, MW

Backgr und

It is widely recognised that mattresses have a finite life-span. In particular Hospital mattresses, typically made from polymer foam materials, are known to degrade over a period of years. Fatigue of a mattress in this way leads to a phenomenon known as 'bottoming' . This refers to the yielding of the mattress to such an extent that the occupant comes into close contact to the hard base of the bed. In hospital this represents a serious hazard, greatly increasing the risk of pressure sores. Since pressure sores constitute a great expense to the Health Service (a single pressure sore costs in the region of £30,000 to treat in terms of bed occupancy and nursing care), it is desirable to detect mattress deterioration early, and dispose of the mattress. Since mattresses are themselves costly, it is similarly important to avoid the disposal of mattresses in good condition.

In the UK a test method has been adopted comprising the indentation of the mattress with the operative's fist to determine mattress condition. This subjective test has been shown to suffer from poor repeatability and inter-operator reliability.

This invention relates to a mechanical device for the determination of the indentation hardness properties of mattresses.

Description

Referring to figure 1 /2, the mattress-tester consists of a pin-jointed linkage of four members. The bars are joined with pins, 1, to allow free movement. Item 3 is a clamp for attachment to the bed-frame. The parallelogram linkage preserves the vertical orientation of th indentor wheel, 5, as the handle, 6, is moved. A rotary potentiometer, or other rotary measurement device, 2, measures the angle between the vertical bars and the non-vertical bars. A load-cell or other force measuring device, 4, measures the force transmitted through the indentor wheel, 5. The indentor wheel, 5, is free to rotate about axle 9, removing side-loads to the load-cell 4 when the indentor wheel 5 is acting on a horizontal surface. These side-loads may otherwise arise from the arc effect of the movement of the linkage. The control-box, 7, contains an analogue to digital converter. Force and displacement information are sampled by a microcoprocessor, and the calculations are performed based on the force/displacement curve. The results of these calculations are then displayed to the user on an LCD or other device on the control-box.

Referring to figure 2 /2, the device is clamped to a bed-frame, 13, such that member 10 is fixed vertical. As the user depresses the handle, the indentor moves parallel to member 10 in the direction indicated by the arrow 14. The indentor wheel displaces into the mattress 12, reacted to by bed-base 11.

Salient features which may be extracted from the force/displacement curve which may be descriptive of the condition of the mattress include:

1. Initial gradient of the curve.
2. Value of force corresponding to a certain value of displacement, eg 90% penetration of mattress.
3. Value of displacement corresponding to a certain force, eg mean body weight.
4. Discontinuities in gradient of the curve, and the position of the transition in terms of force value or displacement value.
5. Hysteresis energy contained within the loading cycle.

Additional embodiments of the device may include:

1. The use of double coaxial wheels to simulate ischial tuberosities (bony prominences within the pelvis which contact the mattress in the seated position.
2. The use of other indenter shapes to simulate other anatomical features.
3. The use of a bleep or other feedback to the operator to indicate that a prescribed level of loading has been reached.
4. The use of a linear displacement transducer mounted diagonally between pin-joints, 1, to determine displacement.

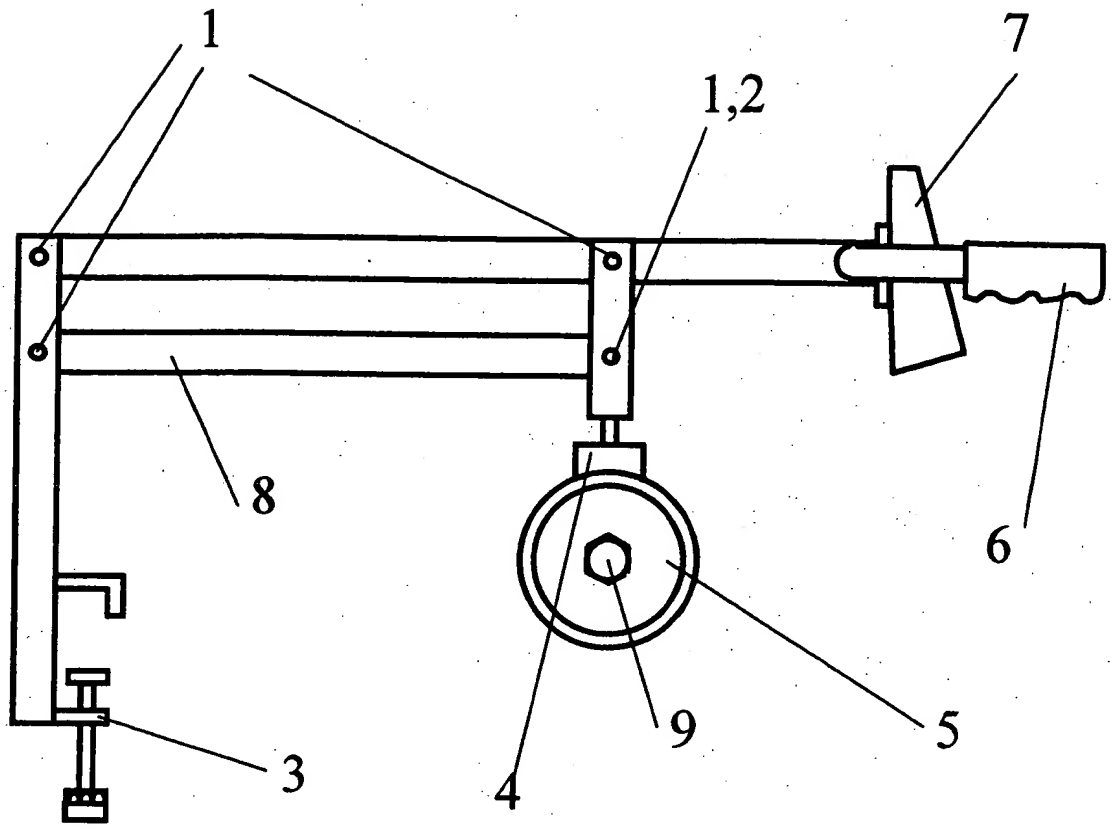

Figure 1 /2

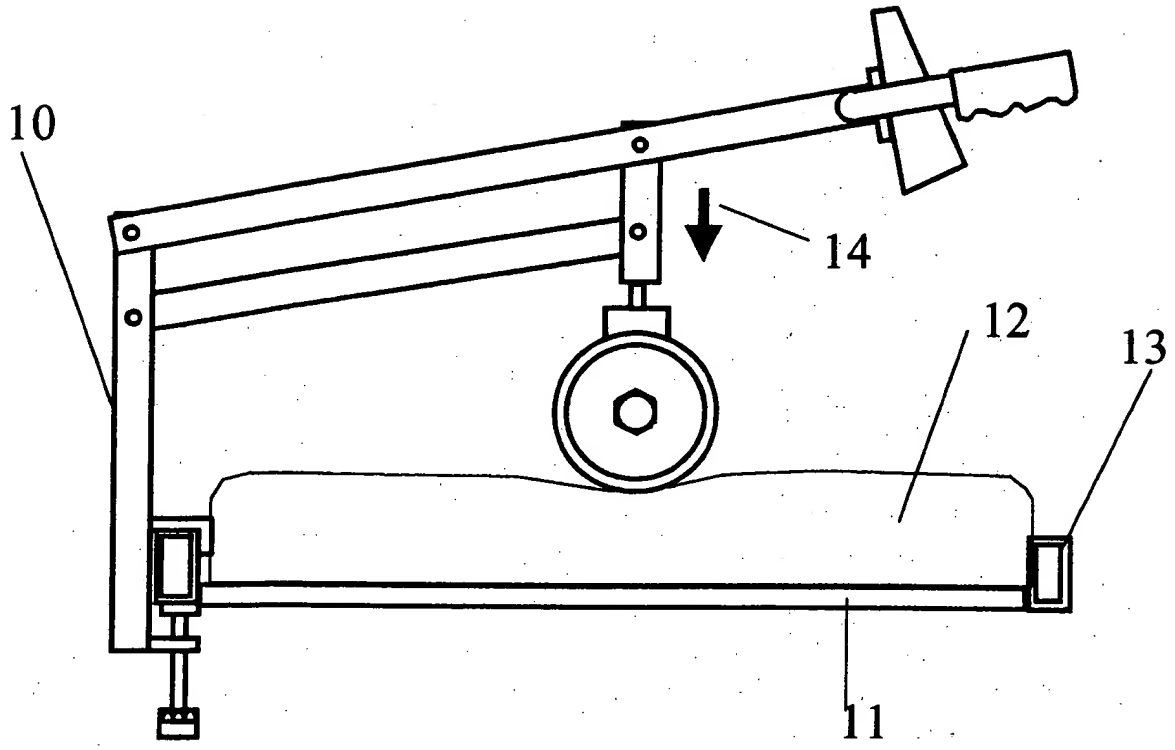

Figure 2 /2

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Form 73/77 : 16.3.00

Agent : Brookes & Martin